Abstract

ABSTRACT

Protection of the environment from pollution is the matter of greatest concern in the current scenario. In this regard, the detection of toxic gases is very important. Nanosensors play a very important role in the gas detection in view of their high sensitivity. The application of nanoparticles in cancer therapy is also gaining momentum, taking into consideration their effectiveness in drug delivery and targeted therapeutic approaches.

The present study was aimed to investigate the possibility of the application of Co_3O_4 nanoparticles (both pure and doped) synthesized by the hydrothermal method, in nanosensors and in cancer treatment. The cobalt oxide nanoparticles were doped with Zn, Fe, Cu and Ni. The impact of three different concentrations (3%, 5% and 10%) of the dopants was studied.

The synthesized nanoparticles were subjected to different characterization techniques using XRD, TEM, SEM, EDX, FTIR and UV analysis. Gas sensing experiments at room temperature and studies on the percentage of cell viability were carried out for the pure and doped cobalt oxide nanoparticles. The synthesized Co_3O_4 nanoparticles are found to be promising gas sensing materials, particularly for NH_3. For the in vivo study, the cytotoxicity analysis was done using the trypan blue exclusion method. The tumour cells were aspirated from the peritoneal cavity of tumour bearing mice. Rodents were used considering the fact that mice and human beings are at least 95% indistinguishable at the genomic level.

The efficiency of the prepared nanoparticles ensured their potential for application in the field of nanotechnology.